

CRENICARA LATRUNCULARIUM
(TELEOSTEI, CICHLIDAE), A NEW CICHLID SPECIES
FROM BRAZIL AND BOLIVIA

by

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ABSTRACT. - *Crenicara latruncularium* sp. n. is collected in the upper and lower Rio Guaporé and in the lower Rio Mamoré drainages. The largest specimen is 88.9 mm SL. It differs from *C. punctulatum* (Günther) in lower meristics, serrated supracleithrum and colour pattern. The two species appear to be allopatric although *C. punctulatum* occurs in the Central and Western part of Bolivian Amazonia, and there are no obvious physical barriers separating the two species within Bolivian Amazonia. The falls of the Rio Madeira may be limiting to northward dispersal of *C. latruncularium*.

RÉSUMÉ. - *Crenicara latruncularium* sp. n. est capturé dans les parties inférieure et supérieure du bassin du Rio Guaporé ainsi que dans le cours inférieur du Rio Mamoré. L'exemplaire le plus grand mesure 88,9 mm LS. L'espèce se différencie de *C. punctulatum* (Günther) par des valeurs méristiques plus faibles, par un supracleithrum denticulé et par le patron de coloration. Les deux espèces paraissent allopatriques bien que *C. punctulatum* se trouve dans les parties occidentale et centrale de l'Amazonie bolivienne, et qu'il n'existe pas de barrières physiques entre les répartitions connues des deux espèces en Bolivie. Les chutes du Rio Madeira paraissent constituer une limite à la dispersion de *C. latruncularium* vers le nord.

Key-words: Cichlidae, *Crenicara*, Amazon River, Mamoré River, Taxonomy, New species.

The South American cichlid genus *Crenicara* Steindachner includes four nominal species: *Acara punctulata* Günther, 1863, *Crenicara elegans* Steindachner, 1875, *Aequidens madeirae* Fowler, 1913 and *Aequidens hercules* Allen in Eigenmann and Allen, 1942. These names obviously all represent synonyms of a single widespread Amazonian and Guyanan species, *C. punctulatum* (Regan, 1905; Kullander, 1986, 1990).

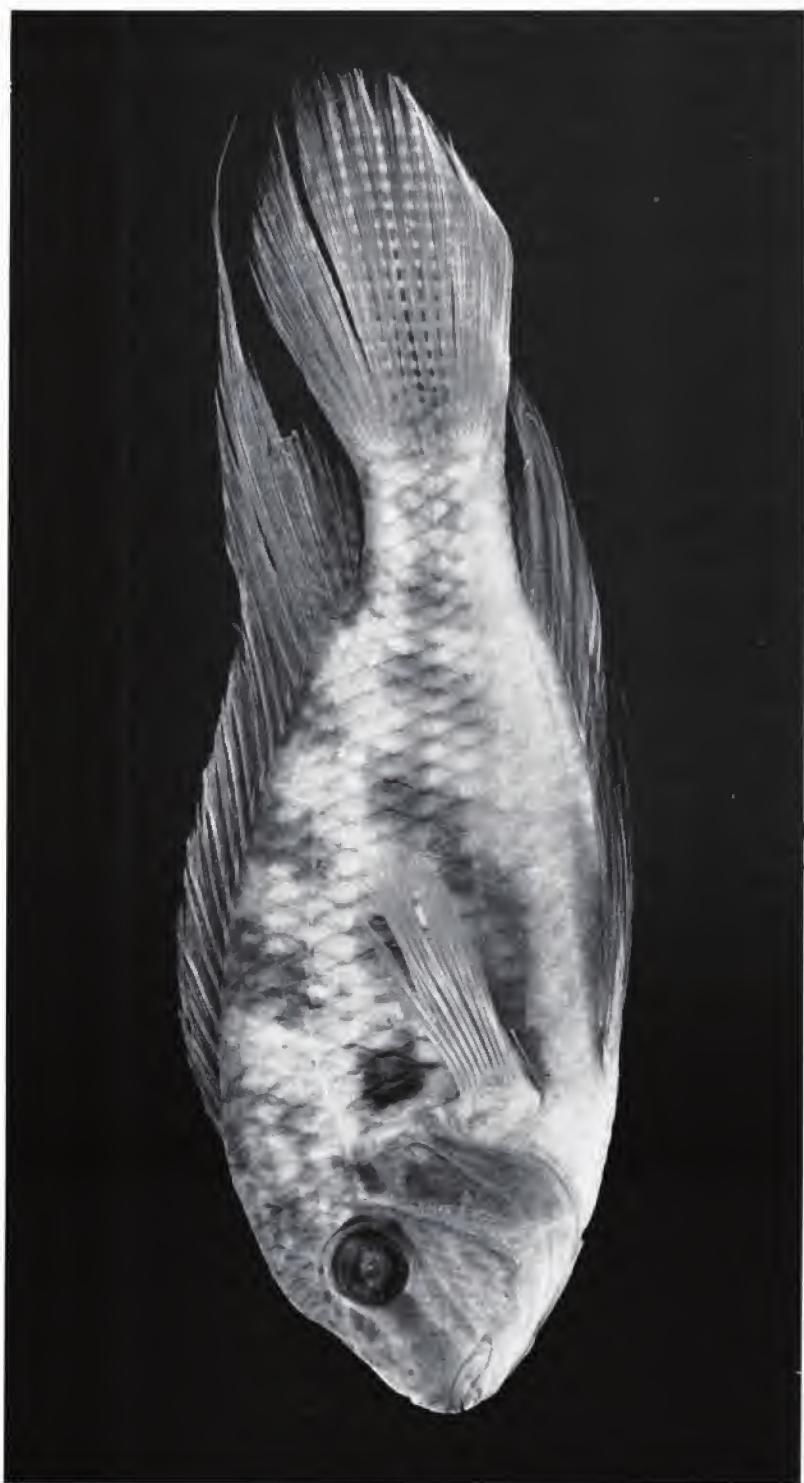
A second, undescribed species has been known for some time (Kullander, 1990) and was introduced recently in the aquarium hobby both in Brazil and Europe. The purpose of the present paper is to give a formal description of this species.

METHODS AND ABBREVIATIONS

Measurements and counts were taken as described by Kullander (1979, 1980a, 1980b, 1983, 1986) and Kullander and Nijssen (1989); the scale row numbering system is as described by Kullander (1990). Observations on life colours and breeding behaviour were made on captive specimens. The preserved material is deposited in the following institutions: FMNH = Field Museum of Natural

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History, Chicago; IRSNB = Institut royal des Sciences naturelles de Belgique, Brussels; MZUSP = Museu de Zoologia da Universidade de São Paulo; NRM = Swedish Museum of Natural History, Stockholm; ZSM = Zoologische Staatssammlung, Munich.

Comparison material of *C. punctulatum* equals material listed by Kullander (1986) with the following significant additions of which data included in Fig. 5, Table I and/or in the text: FMNH 93483, 1 spm, 49.0 mm, Guyana, Gluck Island, British Museum (Natural History), London, BMNH 1864.1.21:26, 1 spm, 75.1 mm, Guyana, Essequibo River, syntype of *Acara punctulata*, BMNH 1979.3.20:228, 1 spm, 70.1 mm, Brazil, Carauari, Academy of Natural Sciences of Philadelphia, ANSP 39315, 1 spm, 49.2 mm, Brazil, Igaraçá de Candelária, holotype of *Aequidens madeirae*, Naturhistorisches Museum, Wien, NMW 33029-33030, 2 spms, 59.2-64.4 mm, Brazil, Curupira, syntypes of *Crenicara elegans*, IRSNB 15866, 44 spms, 32.3-88.0 mm, Brazil, Lago Tefé, California Academy of Sciences, San Francisco, CAS IU 17736, 2 spms, 62.2-93.9 mm, Peru, Rio Morona, holotype and paratype of *Aequidens hercules*, NRM SOK/1986312.5205, 1 spm, 92.7 mm, Peru, Teniente López, NRM SOK/1986313.4558, 1 spm, 88.9 mm, Peru, Teniente López, ZFMK 2200, 1 spm, Bolivia, quebrada below San Francisco.

CRENICARA LATRUNCULARIUM SP. N.

(Figs 1-5, Tables I, II)

Crenicara maculata; Haseman, 1911, p. 344 (listed; mouth of Rio Machupo).

Crenicara sp. A; Kullander, 1990, figs 4,6 (notes).

Diagnosis

Distinguished from the only other *Crenicara* species, *C. punctulatum*, by lower meristics (El scales 26 rather than usually 27, dorsal fin count usually XV.9 rather than usually XVI.9 or XVII.8, vertebrae 13+14 rather than 14+14; Table I), serrated instead of smooth supracleithrum (Fig. 2), and colour pattern: the second to fourth blotches along the middle of the side are anteroventrally extended, the blotches along the back are as distinct as those along the middle of the side instead of fainter, and there are three distinct oblique dark stripes on the cheek instead of none (Fig. 3).

Material examined

Holotype: MZUSP 40290 (Fig. 1). Adult male, 88.9 mm, Brazil, State of Rondônia, Rio Mamoré drainage, Igaraçá do 13 on road Palheta-Guajará-Mirim, 26 Nov 1967. Collected by J.-P. Gosse and Léopold III (Sta. 184).

Paratypes: Brazil, Rio Guaporé drainage: MZUSP 37626, 1 spm, Est. Mato Grosso, mun Pontes e Lacerda, brook on road Cuiabá-Porto Velho, ca 7 km after entrance to Pontes e Lacerda, 23 Sep-10 Oct 1984, J.C. Garavello.

Table I: Variation in number of El-scales, gill rakers and dorsal fin rays in *Crenicara latruncularium* and *C. punctulatum*. Absolute frequencies, modes in boldface.

Species	El scales			Gill rakers				Dorsal fin						
	26	27	28	4	5	6	7	XIV	XV	XVI	XVII			
<i>C. latruncularium</i>	28			3	14	12		1	1	23	5	1		
<i>C. punctulatum</i>	7	45	1	2	5	35	11			1	20	1	28	4

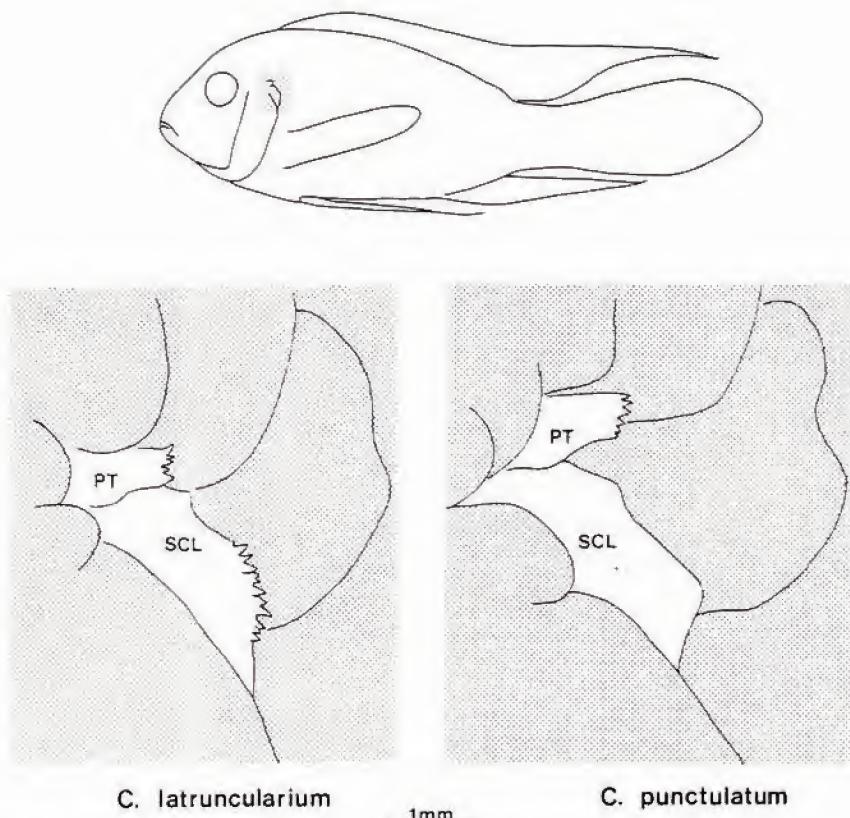


Fig. 2: Difference in pectoral girdle serrations in *Crenicara latruncularium* (NRM A89/1967477.4630, 65.2 mm), in which both the posttemporal (PT) and the supracleithrum (SCL) have serrated margins, and *C. punctulatum* (NRM SOK/1984326.3910, 66.7 mm), in which the margin of the supracleithrum is smooth. Scale for lower two figures only.

MZUSP 37500, 1 spm, Est. Mato Grosso, R. Alegre ca 30 km from Vila Bela da Santíssima Trindade, 28-30 Sep 1984, J.C. Garavello *et al.* NRM SOK/1989422.6135, 4 spms, 28.9-49.1 mm, Est. Mato Grosso, Rio Guaporé at ferry landing in Vila Bela da Santíssima Trindade, 17 Oct 1989, S.O. Kullander, A. Hogeborn-Kullander, K. Tanizaki, M.T. Lacerda (BRA 89-19). NRM A89/1987809.4712, 2 spms, 21.1-34.5 mm, Est. Mato Grosso, small lake ca 4 km NE Vila Bela da Santíssima Trindade. 5 Aug 1987, W. Staack. NRM A89/1987809.4714. 2 spms, 35.6-43.1 mm, Est. Mato Grosso, pools on road Pontes e Lacerda-Vila Bela da Santíssima Trindade, ca 8 km from Pontes e Lacerda, 4 Aug 1987, W. Staack. NRM A89/1987809.4713 (12 spms), MZUSP 40291(6 spms), IRSNB 795 (6 spms) and ZSM 27606 (6 spms), 30 spms, 19.6-31.7 mm, Est. Mato Grosso, Rio Guaporé, sand bank 20 km downstream of Vila Bela da Santíssima Trindade, 8 Aug 1987, W. Staack. Rio Mamoré drainage: IRSNB 783 (4 spms) and NRM A89/1967477.4630 (1 spm), 5 spms, 38.4-65.3 mm, same data as holotype. IRSNB 782 (3 spms) and NRM A89/1967477.4629 (1 spm), 4 spms, 44.7-51.2 mm, Est. Rondônia, mouth of Igarapé de Palheta, above Guajará-Mirim, 26 Nov 1967, J.-P. Gosse & Léopold III (Sta. 185). - Bolivia, Rio Guaporé drainage: NRM A84/1984364.4628, 1 spm, 33.9 mm, Depto Beni, mouth

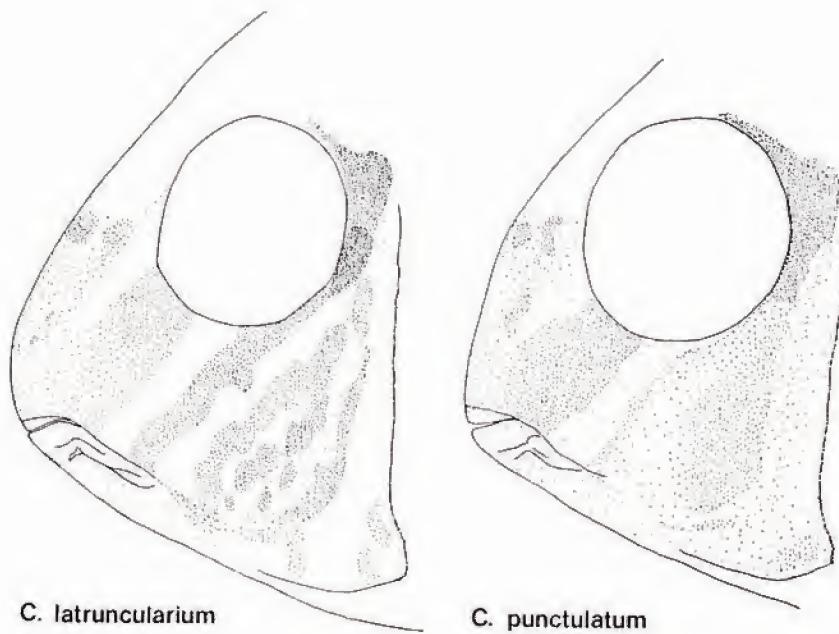


Fig. 3: Difference in dark pigmentation on the sides of the head in *Crenicara latruncularium* (NRM A89.1967477.4630, 65.2 mm) with distinct oblique stripes on the cheek, and *C. punctulatum* (NRM SOK/1983334.3682, 64.1 mm) without corresponding stripes.

of Rio Machupo. 6 Sep 1984, G. Loubens. FMNH 54089. 1 spm, 21.0 mm, Depto Beni, mouth of Rio Machupo, 27 Aug 1909, J.D. Haseman (previously Carnegie Museum N° 2638).

Description

Data below are primarily from the Guajará-Mirim lots which are slightly faded but otherwise in excellent condition. Four of these specimens are males, 51.2-88.9 mm, and six are females, 38.4-65.3 mm; measurements of these ten specimens are summarized in Table II; some counts also from the other NRM specimens. Only the holotype, the largest male, displays marked secondary sexual characteristics, i.e. steep front, produced fins and darkened throat, the other specimens are all very similar to each other.

Elongate, strongly compressed laterally; dorsal and ventral contours about equally arched; young up to about 50 mm more slender (depth < 40% of SL) than adults (depth \geq 40% of SL). Ventral margin of caudal peduncle slightly longer than dorsal margin. Head short, deep. Snout blunt; in adults frontal outline about evenly arched or, in holotype, concave anterior to orbits, nape outline straight. In holotype, orbit in about middle of head, interorbital space slightly convex. In young, interorbital area not as convex as in adults, snout short, deep and obtuse, ascent of frontal contour more level, orbit relatively larger and in anterior half of head. Mouth narrower than interorbital space. Jaws equal or upper jaw slightly prognathous; vertical through posterior tip of maxilla nearer to orbit than to nostril in large specimens, reaching anterior margin of orbit in young. Folds of upper and lower lips very short. Postlabial skin fold covering margin of upper lip. Depth:length ratio of opercle increasing from 1:1 in young to about 2:1 in the largest specimen. Preopercle with 54-98 denticuli along posterior margin and

corner, number irregularly increasing with SL; posttemporal with 4-7 irregular denticuli, supracleithrum with 6-11 denticuli (Fig. 2).

Scales ctenoid, except two cycloid scales on interoperculum, anterior prepelvic scales and distal caudal fin scales. Predorsal scales about 9-10 along midline. Scales in El row 26(28); between upper lateral line and dorsal fin 3-3½ anteriorly, 1½ posteriorly; between lateral lines 2; in transverse row 8+1+2½; around caudal peduncle 16; rows on cheek 3(9), 4(1). Lateral line scales 16, 8(1), 17/7(1), 17/8(1), 17/9(2), 17/10(2), 17/11(1), 18/9(1), 18/10(1); commonly 1-4 anterior scales of lower line pored. One or two tubed scales continuing lower line on caudal fin; in 65.3 mm specimen a tubed scale bilaterally between rays D3 and D4 on caudal fin, otherwise no accessory caudal fin lateral line scales. Dorsal, anal, pelvic and pectoral fins without scales. Caudal fin scaled basally, posterior margin of scaled area concave, extending to about middle of fin marginally.

First dorsal fin spine about 1/3-½ length of last, spines increasing in length to last, subequal from sixth. Lappets short, truncate with posterior pointed angle. Soft dorsal fin in holotype pointed, fourth to fifth soft rays forming point, fifth ray produced and reaching to end of caudal fin; in most other specimens rounded, reaching to or slightly beyond base of caudal fin; pointed, but short, in 65.2 mm male. D. XIV.10(1), XV.8(1), XV.9(23), XVI.8(5), XVI.9(1). First anal fin spine opposite antepenultimate dorsal fin spine. Soft anal fin in holotype pointed, fourth to sixth soft rays forming point, fifth ray longest, reaching beyond middle of caudal fin; in 65.2 mm male pointed, but reaching only to about 1/5 of caudal fin; in other specimens rounded, reaching to or slightly beyond base of caudal fin. A. III.8(10). Pelvic fin pointed, first ray longest, its inner branch slightly longer than its outer branch, reaching to base of fifth soft ray of anal fin in holotype; in other specimens reaching to anal fin origin; in the only large female (65.3 mm) first and second rays equal in length, in the others the first ray slightly longer than second. Pectoral fin rounded, fourth ray slightly the longest, reaching to vertical from first anal fin spine. P. 14(6), 15(4). Caudal fin in most specimens subtruncate or slightly rounded, dorsal lobe slightly the longer. Caudal fin in holotype sublanceolate; rays D3-D8 forming straight oblique margin, ray D2 (longest) forming tip, rays D1 to

Table II: Morphometry of *Crenicara latruncularium*; measurements expressed as per cent of SL, except linear ($a+bX$) and exponential ($a e^{bX}$) regressions against SL and holotype (HT; SL = 88.9 mm) measurements, in mm. N = 10, 38.4-88.9 mm SL.

Measurement	HT (mm)	Min-Max (%SL)	$\bar{x} \pm SE$ (%SL)	y	r
Head length	24.5	27.5-29.7	28.3±0.23	$0.992+0.263X$	0.999
Snout length	8.5	5.6-9.5	6.5±0.40	$0.815 \cdot e^{0.026X}$	0.995
Body depth	36.3	37.0-40.8	39.5±0.44	$-1.944+0.433X$	0.998
Orbital diameter	8.7	9.8-13.0	11.8±0.31	$2.292+0.073X$	0.998
Head width	12.7	14.3-16.1	15.6±0.18	$1.340+0.129X$	0.998
Interorbital width	8.3	8.5-9.3	8.9±0.08	$-0.513+0.099X$	0.999
Preorbital depth	7.1	4.2-8.0	5.8±0.34	$-2.460+0.106X$	0.998
Caudal peduncle depth	13.4	14.3-15.5	14.9±0.10	$-0.219+0.153X$	0.998
Caudal peduncle length	14.5	14.3-16.3	15.5±0.23	$-0.789+0.171X$	0.992
Pectoral fin length	29.1	31.3-34.0	32.9±0.23	$-0.041+0.330X$	0.998
Pelvic fin length	41.6	28.6-46.8	31.5±1.73	$4.218 \cdot e^{0.025X}$	0.994
Last D spine length	16.8	16.6-18.9	17.6±0.28	$-1.728+0.210X$	0.998

V8 forming a rounded margin. Male, 65.2 mm, with caudal fin shape intermediate between that of holotype and remaining specimens.

Teeth caniniform, straight or slightly recurved apically. Very wide band of subequal teeth anteriorly in both jaws; anterior teeth of lower jaw slightly procumbent. Upper jaw outer hemiseries in seven specimens, 38.4-51.2 mm, with 9-14 teeth anteriorly and five of these (43.0-51.2 mm) with 1-4 teeth near posterior tip of jaw, well separated from anterior teeth; in three specimens, 65.2-88.9 mm, a continuous hemiseries of 19-23 teeth along entire rim of jaw half. Lower jaw outer hemiseries in two specimens, 38.4-43.0 mm, with 15 teeth; in eight specimens, 44.7-88.9 mm, 18-23 teeth. Inner rows 3-4 in upper jaw, 3-5 (usually 4) in lower jaw.

Outer face of first gill arch with 1 epibranchial gill raker, 1 in angle and 4(3), 5(14), 6(12) ceratobranchial gill rakers, all short. Microbranchiostines absent from all gill arches.

No tooth plate on ceratobranchial 4; lower pharyngeal tooth plate as in *C. punctulatum* (cf. Kullander, 1986), in dissected 65.2 mm specimen.

Vertebrae 13 + 14 = 27(6).

Coloration

Preserved colour pattern: Ground colour yellowish or whitish; markings brown. All scales above level of pectoral axilla with narrow dark margin. Row 0 scales on anterior half of side or all the way back to caudal fin each with whitish center. Vila Bela specimens with indistinct horizontal stripes formed by light scale centers and dark upper and lower thirds of scales, on back and middle of side but not in E1 scale row.

Six dark squared blotches along middle of side; the first most prominent, blackish, covering first two E1 scales and adjacent parts of row 0 and row E2 scales; second to fourth blotches cover, respectively, 6th-7th or 6th-8th, 11-12th or 12th-13th, and 16th-17th E1 scales and adjacent 1/3 of scales in 0 and E2 rows, and extend equally intense or slightly fainter forwards and downwards on scales of rows 0, H1 and H2. Fifth and sixth blotches cover E1 (ca 20th and ca 23rd-24th, respectively) and 0 row scales and portion of scales above and below. In young specimens, all blotches or the three posterior more or less intermediated by pigment, forming an indistinct lateral band continuous with basal caudal fin spot.

Six dark blotches along back and caudal peduncle. The first extending as stripe obliquely forwards from dorsal fin origin to just short of reaching to posttemporal. In holotype nape pigment and first dorsal blotch form single, indistinct dark marking. Second to fourth blotches also slightly forwards inclined, reaching down to E3 scales and corresponding in position to interspaces between first to fourth midrow blotches; second blotch below about sixth to eighth dorsal spines, third about below 11th-12th or 11th to 13th dorsal spines, fourth below last spine and first two rays or below first three rays of dorsal fin. Fifth blotch situated dorsally at end of dorsal fin base and beginning of caudal peduncle, above fifth midrow blotch. Sixth blotch situated dorsally at posterior margin of caudal peduncle, above sixth midrow blotch.

Snout frontally pale grey with numerous irregular dark dots. Nape above eyes brownish or with light scale centers and contrasting broad dark scale margins. A light stripe from orbit to nostril. Lachrymal grey on nasal half, buccal half light, adbuccal margin of lachrymal and infraorbital series grey; a whitish stripe on cheek along lachrymal margin. Cheek with obscure pigment patch on posterior half, indistinct in large specimens; cheek scales dark margined to form three oblique dark stripes, posteriormost along inner margin of preopercle (Fig. 3). Short, dark stripe from dorsal tip of preopercle obliquely dorsad to exposed part of posttemporal. Branchiostegal membrane and intermandibular area dark grey in holotype, dusky in 65.2 mm male, light in all other specimens.

Dorsal fin light brownish; lappets and dorsal margin of soft portion hyaline; five to eight posterior interradial membranes with oblique hyaline dots. Anal fin brownish, darker towards lower margin, immaculate except that interradial membranes in holotype and 65.2 mm male with about three rows of very narrow oblique hyaline stripes on basal half of fin. Pelvic fin brownish along anterior margin, gradually paler towards posterior margin; light in small specimens. In holotype dorsal margin of caudal fin with wide hyaline border and about 18 straight vertical rows of dark spots across fin except along duskyed ventral margin, spots darker on middle membranes, a dark spot at base of fin almost completely faded; in the others a prominent dark spot at middle of base of caudal fin, cross stripes of spots fewer and distinct only along middle of fin.

Life colours: Body pale yellowish brown, ventrally whitish, nape and dorsal region light brown. Cheeks with 3-4 slanting metallic green stripes on a maroon ground colour. Opercular flap with similar, but more irregular colour pattern. In sexually active males branchiostegal membrane pink. Posterior part of sides sometimes with a faint pink tinge in dominant males.

Dorsal fin yellowish grey with a thin submarginal white stripe and orange or red lappets. Anal fin in males purple, bluish along margins. Pelvic fin in males purple with blue anterior margin. Anal and pelvic fin in females bright orange, turning red during brood care. Caudal fin in females hyaline with the exception of its dark middle; in adult males greyish with 8-9 vertical rows of dark spots; upper part of caudal fin in males with red margin and white submarginal stripe.

The pattern of dark markings as described from preserved specimens is extremely variable in live fish as it is influenced by behavioural condition. The checkerboard pattern is most conspicuous under the influence of stress. In fish being in a neutral mood it may be reduced to 3-4 blotches in the middle of the anterior part of the sides. In females the two rows of dark blotches merge into two lateral bands during brood care.

Distribution

Known only from along the border between Brazil and Bolivia (Fig. 4). Six localities are in the upper Rio Guaporé drainage (Vila Bela da Santíssima Trindade, Pontes e Lacerda, Rio Alegre). There are two specimens taken at the mouth of the Rio Machupo, a left bank tributary of the Rio Guaporé. Two localities are close to Guajará-Mirim on the Rio Mamoré, well downstream of the mouth of the Rio Guaporé: the type locality is situated on the road to Palheta, 13 km from Guajará-Mirim, in a small stream flowing into the Rio Mamoré a few km upstream of Guajará-Mirim, the other site is along the lower 200 m of the same stream.

Ecology

All the specimens collected by WS at three different localities in August 1987 were caught in dense stands of aquatic vegetation (*Echinodorus* spp., *Ottelia brasiliensis*, *Eichhornia azurea*, *E. diversifolia*, *Cabomba piauhensis*). At one collecting site, a sand bank in the Rio Guaporé, there was a remarkably strong current. At the other localities the water was more or less stagnant. Water analyses were made by WS in 1987 at three paratype localities: roadside pools near Vila Bela (21°C, pH 7.1, conductivity 70 µS), a lake 4 km NE Vila Bela (24°C, pH 6.0, 30 µS), and at river sand bank downstream of Vila Bela (20°C, pH 6.3, 20 µS). At all sites the water was clear and colourless, the total and temporary hardness below 1°dH. The associated fish fauna included the cichlid species *Apistogramma trifasciata* (Eigenmann & Kennedy), *A. inconspicua* Kullander, *Aequidens plagiozonatus* Kullander, *Mesonauta festivus* (Heckel) and *Satanoperea pappaterra* (Heckel), and also *Corydoras* sp. (Callichthyidae) and several characid

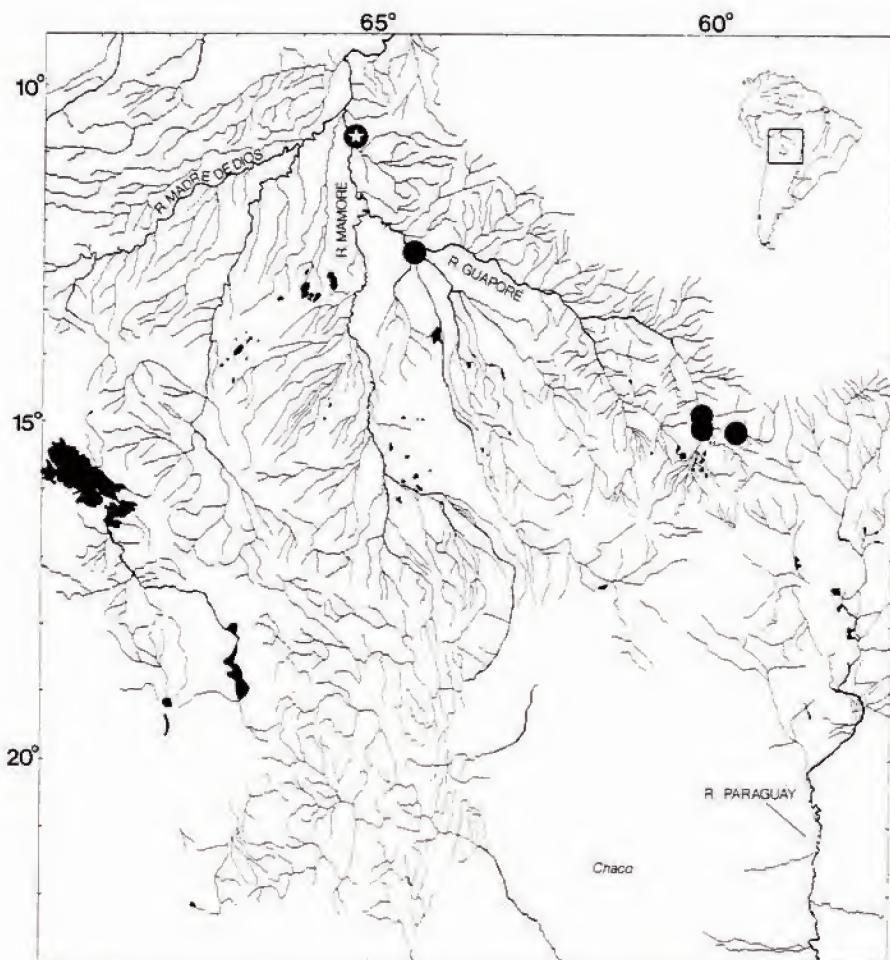


Fig. 4: *Crenicara latruncularium*, collection localities plotted on a map of Bolivian Amazonia; one symbol may cover two collecting sites. Symbol with star indicates type locality.

species including *Hyphessobrycon callistus* (Boulenger) and *Aphyocharax rathbuni* Eigenmann.

Reproductive behaviour

Like *C. punctulatum*, *C. latruncularium* is a polygynous substrate spawner. Observations under aquarium conditions showed that the male defends a territory containing several potential spawning sites. Each of them may serve as the focus of a smaller territory occupied by a female. Like most other open brooders these cichlids place their eggs on a vertical surface. The preferred spawning site is a large stout plant leaf. Usually the fish select the leaves of swordplants (*Echinodorus* spp.).

At 27°C hatching occurs about three days postspawning, and the fry attempt swimming six days thereafter. After spawning the female drives the male energetically from the close proximity of the spawning site. Parental care is exclusively maternal in this species, although the male may indirectly assist by

defending the brooding territory. After hatching, the female moves the larvae to a previously prepared shallow pit.

Etymology

Named with reference to the checkerboard (*tabula latruncularia*) pattern of the sides; *latruncularius* is an adjective referring to the Roman counterpart to the chess play (*lusus latruncularius*) (Georges, 1966).

DISCUSSION

The taxonomy of *Crenicara* was briefly discussed by Kullander (1986, 1990). The latter paper distinguished *Crenicara* for two large species, *C. punctulatum* and *C. latruncularium*, and *Dicrossus* Steindachner for four smaller species until then usually referred to *Crenicara*. The relative rank of these genus group names and their interrelationships are left for future address.

Crenicara latruncularium is very similar to *C. punctulatum*. That species was described at some length on the basis of Peruvian material in Kullander (1986). The two species cannot be separated by proportional measurements, although *C. latruncularium* may average slightly longer snout than *C. punctulatum* (Fig. 5), but are diagnosed by meristic characters, serrated supracleithrum and colour pattern as discussed below.

Both species show strong positive size allometry in snout length, especially from about 80 mm SL. Only males grow larger, and then develop sex characteristic long fins (note exponential growth of pelvic fin, Table II). Too few large specimens are available of *C. latruncularium* to judge about the reliability of the exponential regression line in Figure 5, but the pattern is very similar to that of *C. punctulatum*, and the regression line parallel at smaller sizes.

Crenicara latruncularium has usually D. XV.9, whereas XVI.9 and XVII.8 are the most frequent dorsal fin counts in *C. punctulatum*, in which species no 15-spined specimens have been observed. Most *C. punctulatum* have 17 dorsal spines, a count still unknown from *C. latruncularium*. The dorsal fin count frequencies of both species are shown in Table I. The E1 scale row count (26) is lower in *C. latruncularium* than in most *C. punctulatum* (range 26-28, mode 27) (Table I). *C. punctulatum* also usually has 18 or 19 scales in the upper lateral line (Kullander, 1986, and unpubl.), whereas *C. latruncularium* has usually 17. The vertebral count is $13+14 = 27$ in *C. latruncularium* and $14+14 = 28$ in *C. punctulatum* (Kullander, 1986; N = 9 including unpublished data). *Crenicara latruncularium* may have fewer gill rakers, averaging 5 rather than 6 (Table I), but geographic variation may be at hand since the Vila Bela area specimens usually have 6, the others 4 or 5.

The serrations of the posttemporal and supracleithrum (Fig. 2) are well developed in *C. latruncularium*, about as in species of the similar genus *Dicrossus*. In *C. punctulatum* the posttemporal denticuli are commonly few or hardly discernible; and the supracleithrum is always smooth margined. The two species seem comparable with regard to preopercular serrations.

Some reservation must be expressed about using colour characters of preserved specimens to separate *C. punctulatum* and *C. latruncularium* as most of the adult *C. latruncularium* available are slightly faded. This may be expressed as increased contrast between dark and light areas; however, the following two characters seem to hold good also for faded *C. punctulatum* and well preserved *C. latruncularium*.

In *C. punctulatum* the dark blotches along the dorsal sides are considerably fainter than those along the middle of the side, whereas in *C. latruncularium* the dorsal blotches are about as strongly expressed as the midrow blotches. In *C.*

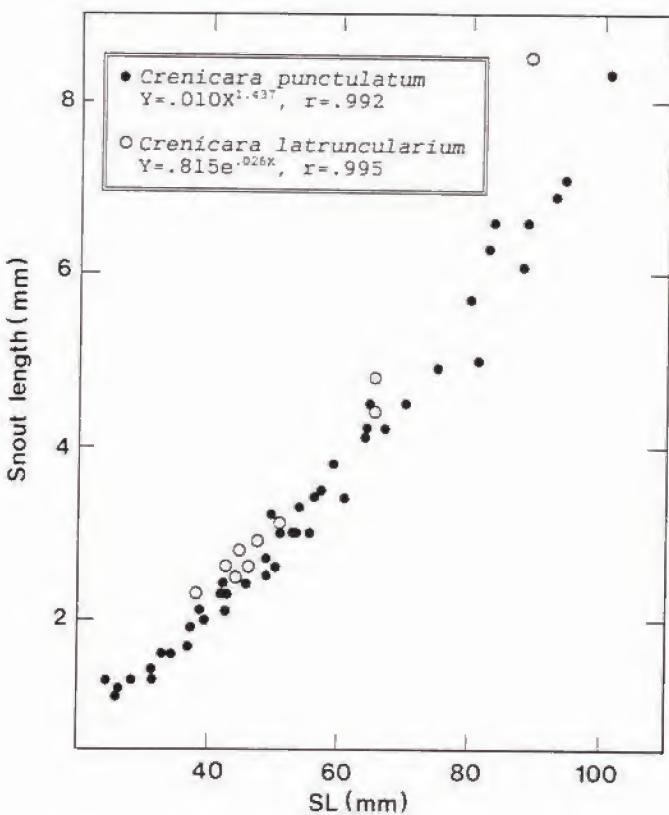


Fig. 5: Snout length plotted against SL to show average slightly longer snout in *C. latruncularium* ($N = 10$) than in *C. punctulatum* ($N = 45$).

latruncularium the midrow lateral blotches are deeper than in *C. punctulatum*; in the latter species they do not exceed two scales in depth, whereas in *C. latruncularium* the second to fourth blotches in particular are anteroventrally expanded, spanning over 4-4½ scales. The anteroventral extension of the midrow blotches is occasionally indicated in *C. punctulatum*, but only as a trace. The dark and light stripes on the snout and cheek (Fig. 3) described above for *C. latruncularium* are a consistent feature although the cheek stripes develop only from ca 30 mm SL, and they seem to be less intensely pigmented in females. In *C. punctulatum* the stripe from the eye to the nostril and those on the lachrymal are present, but the cheek is mainly dark posteriorly, light anteriorly. In large males of *C. punctulatum* the lachrymal pattern becomes obscure, nearly uniformly grey.

In live specimens of *C. latruncularium* the conspicuous colour pattern on the cheeks is a distinguishing feature that is absent in *C. punctulatum*. Adult males of *C. punctulatum* may instead be identified by the yellow colouration of the lower head, chest and abdomen (cf. Linke and Staek, 1984, p. 170, colour photo).

The presence of a tubed accessory lateral line scale on the caudal fin of one specimen of *C. latruncularium* represents a rare feature in crenicarine cichlids, among which accessory caudal fin lateral line scales are recorded only from one of the two known specimens of *Mazarunia mazarunii* Kullander (1990).

The distribution of *C. latruncularium* seems restricted to the border between Brazil and Bolivia, i.e. the Rio Guaporé and adjacent Rio Mamoré. The adjacent Bolivian Amazonia is not well known ichthyologically, however, and further collections to the west of the Guaporé may show a wider geographical range for the species. Even so, it seems likely that *C. latruncularium* and *C. punctulatum* are allopatric.

The Guaporéan cichlid fauna is in general distinct from that of the rest of the Amazon basin at species level, but the ranges of component species includes also part of the rest of Bolivian Amazonia and/or the Paraguay drainage, e.g., *Papiliochromis altispinosa* (Haseman) which is collected in the upper Mamoré drainage (Kullander, 1981), and *Astronotus crassipinnis* (Heckel) and *Mesonauta festivus* (Heckel) which are also collected in the Paraguay and Madre de Dios drainages (Kullander, 1986). The falls of the upper Rio Madeira may be the principal barrier of dispersal to Guaporéan and adjacent Brazilian Amazonian fishes.

The *Crenicara* collected in the upper Rio Madre de Dios and Rio Chaparé (Central Bolivia) are, however, identified as *C. punctulatum* (Kullander, 1986, 1990, and unpubl.). This suggests for the *Crenicara* species a situation similar to that of *Satanopercajurupari* (Heckel) and *S. pappaterra* (Heckel). *Satanoperca jurupari* is widely dispersed in Amazonia, including Bolivian Amazonia, but replaced by *S. pappaterra* in the Guaporé and Paraguay drainages (Kullander, 1986, and unpubl.).

There is no known physical barrier between the western Bolivian Amazonian and Guaporéan populations of *Crenicara* and it will be of interest to collect in the intermediate area to investigate other possible barriers or possible sympatry.

Haseman (1911) was the first to report a specimen of *C. latruncularium*, a 21 mm specimen collected in the Rio Machupo which he misidentified as *Crenicara maculata* (*Dicrossus maculatus* Steindachner). At this small size *Crenicara* and *Dicrossus* species are quite similar, but the lower pectoral fin count (11-13, usually 11-12 vs. 13-16, usually 14-15) and the lack of anguloarticular lateralis canal in *Dicrossus* species are useful for separation.

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